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Procedia Economics and Finance 32 (2015) 514 – 519

Procedia Economics and Finance

www.elsevier.com/locate/procedia

Emerging Markets Queries in Finance and Business

The implementation of new work instructions in the training of human resources in the process of paining in electrostatic field

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Abstract

A product, process or service complies with the requirements if one or more of its characteristics satisfy the specific requirements and expectations of the client. In case in which the product doesn't comply with the requirements, regardless if the flaws were detected during the internal process or due to customer complaint, it is supposed that there may be problems at the company at any level generated by third parties, among them might be the lack of, poor or insufficient training of human resources involved in the process of production.

Selection and peer-review under responsibility of Asociatia Grupul Roman de Cercetari in Finante Corporatiste

Keywords: human resources, painting in electrostatic field, quality, not complying with, work instructions, training

1. Introduction

Painting in electrostatic field is a part of the process of treatment, coating and decorating metallic surfaces. A part of painting in electrostatic field is that of powder coating.

Within this type of paining there are a series of elements that influence the quality of the finished product, having a significant impact on the finished product, namely on the quality of the painted products: an

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Selection and peer-review under responsibility of Asociatia Grupul Roman de Cercetari in Finante Corporatiste
doi:10.1016/S2212-5671(15)01426-4

inconsistency between the requested and provided level of quality, the quality of the paint, the quality of the raw material, the quality of the chemical pre-treatment used before the process of paining etc. The direct or indirect influence of these factors on the quality of the final products can be highlighted through information and data from the textbook about quality, analyzing in detail the procedures and instructions of work.

This study presents the advantages of using new instructions based on clear data and simple results founded on practices from the workplace and based on the method of comparing descriptive, traditional information with information supplied by photographs made during the process of paining in the process of instructing human resources. Such a practice can be seen as guide of good practice for those who work or want to work in the field of powder coat paining and not only there.

2. Theoretical foundations

The main quality system management documents and how to edit it are presented in the ISO 10013/1996 Standard – Guidelines to do Quality Manual. References to the documents are made in the ISO 9000, ISO 9001/2000 standards.

These standards give great importance to the drafting and administration of specific documents of the quality systems, because the documents are a tangible proof that the processes were defined, elaborated and approved, and the modifications are under control.

Also, the existence of the documents is compulsory for appreciating the conformities of the quality system with the standards of reference and confirming the effective implementation of the quality systems.

The role of documents for implementing and applying the quality (Juran and Gryna, 1995) system consists of:

- achieve compliance with the requirements of the regulations;
- providing training to employees (Blaga, 2011) for them to know the implementation of the quality system;
- ensuring repeatability and traceability;
- provide objective evidence of the application of the quality system.

The amplitude of the documentation for a technical-economical system varies depending on the size and the object of the activity, the complexity of the processes and their interaction, the staff's training according to the ISO 10013 standard. Thus, the documents of a quality system management (Kuchler, 1981) are:

- the policy and objectives of quality;
- Quality Manual;
- documented procedures required by the standards of reference (CAEQ, 2001);
- work instructions.

3. Description

The work instructions represent a provision that formulates the ways of performing an action associated with a procedure.

The instructions are elaborated, regarding their scope, a stage or two, after which they are analyses (in terms of their clarity, preciseness, suitability and structure), they are approved by the head of department and by the company's general manager.

The creating and writing of instructions has to be done by people who are involved in the described processes and activities. This is done based on specific documents and is valid within each department that coordinates the regulation process and based on rendering processes according to the company's strategy and objectives (Richard and Johnson, 2001).

The tasks established in the instructions are determined according to the type of work, place of work, the work environment and the means of work, all are elaborated by experts in the field.

Within the work process the employer has to ensure conditions for each employee to receive enough and suitable training in the form information and instructions specific to their work place or their job (Blaga and Boer, 2014).

Usually, the information included in the instructions has to contain a minimum number of data about:

- usage, terms and conditions of work equipment;
- the situations of conformity and non-conformity of the product.

All this data has to be understood by everyone, has to be easily assimilated, accessible and updated.

Work safety issues also have to be included, stated by *The law of security and health at work no. 319/2006*, valid through the amendments and regulations in force which through art. 22, 1st paragraph states that: *"each worker has to operate according to their training and instruction received from their employer, so that he or she shall not expose himself to the dangers of accidents or professional disease or other people who may be affected by their actions or omissions during the work process."*

In this case the situation of presenting the instructions in the simplest and most appropriate ways, understandable for every employee, is preferred.

The instructions are destined for detailing activities of procedure, mainly of those that can affect the correct development of the procedure concerning the process, the so-called critical activities. Practically, it can be presented like this (Fig. 1).

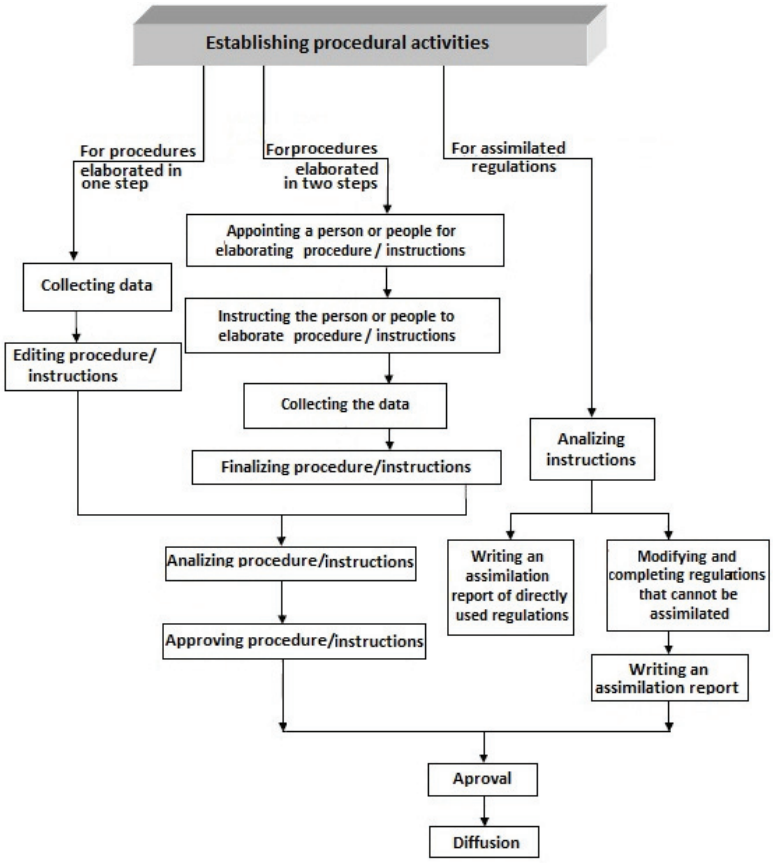

Fig.1. The logical scheme of elaborating instructions

Based on this track the development of instructions within SC Allcolors Serv Srl, one of the top leaders in the field of electrostatic powder coating, can be achieved.

The intention of the company's management as that for all the company's employees each instruction to fulfill the following requirements:

- to be concise and easy to remember;
- to define exactly what is expected of employees;
- to be global, cover all the fundamental aspects of quality (Stahl, 1995).

The goal of the company is performance and reputation gained through quality, by reaching the following objectives:

- continuous improvement of the methods used in painting (Boer and Blaga, 2012);
- obtaining and maintaining current and potential customers' requests (Collier, 1987) in accordance with company tradition for over 20 years on the market, as in guaranteeing maximum quality for the painted products (Boer and Blaga, 2014).

For this reason the decision was made to make an implementation in the completion of instructions used until now. The regular used model and standard was to assure a textual description(Fig. 2a), as brief as possible, that was desired to be received and assimilated by the staff (Garcia-Quevedo et al., 2011).

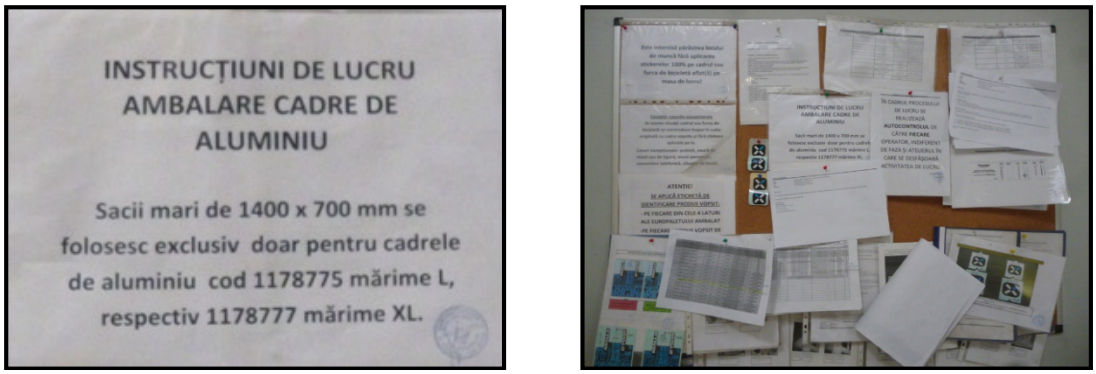

Fig.2. (a) The standard model of instructions; (b) Standard panel model for work instructions

The information found in this type of documents were easily assimilated and did not generate confusion in the case they were dedicated, or effective for similar products, given that they be completed through other instructions, with updated specifications destined for new projects.

But, due to many ongoing projects, and as a result of the existence of many other documents that needed to be processed and displayed visibly, there has been a conclusion: there was a necessity to create a new type of informing (Nafukho et al., 2004) because the information and textual data from the documents were growing in number and needed more and more space to be displayed (Fig. 2b).

It was also noticed, that by assimilating more and more information from the displayed documents and for processing them there was needed bigger and bigger intellectual memorizing effort from the employees, fact that determined a increase of idle time in the process of actual work (Wieslaw, 2013), time that was needed for the assimilation of the information from the instructions.

So, the decision was made to use photographic material instead of traditional documents for conveying information from the instructions. This new form of presentation of an instruction has the objective to visually render aspects that are waiting to be done by the staff, highlighting by comparison of what is expected to be done, versus what is not expected to be done or what is not according to the quality expectations, obtaining in such a way a briefer, a simpler and a more efficient way of informing (Fig 3).

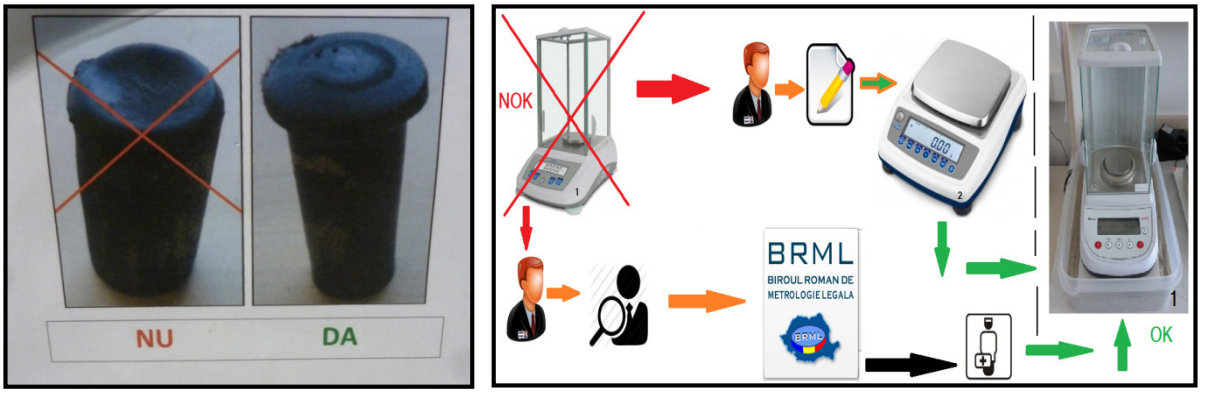

Fig.3. (a) New model of photographic instructions; (b) Mixed model of graphic and photographic instructions

By comparing the needed time for presenting, processing and assimilating information from these traditional instructions for the staff with those related to the new photographic ways of presenting instructions, it has been observed that in the case of the photographic model the needed time has been cut by 50% (Table 1, Fig.4).

Table 1. Time needed for presenting and processing textual instructions versus the photographic information

Model W.I.	1	2	3	4	5	6	7	8	9	10
Textual	1:57	5:15	7:08	8:06	4:17	8:42	6:25	12:52	9:12	11:20
Photographic	0:59	2:57	3:34	4:04	2:44	4:10	3:02	5:14	4:10	5:23

The major advantage of the new way of presenting information is highlighted in the time obtained economy, and by eliminating the idle time from the time activity from work of each employee, and the obtaine dprogress was considerable and with immediate effect (Blaga and Boer, 2012). In the case of most employees it has been noticed that the visual impact of the photographic information in a long term lead to much better results at the work place (Wilkinson, 2005) than those of assimilation and processing texts, especially since the majority of the research participants had an average level training (Table 2, Fig. 5).

Tab.2 Time needed for presenting and processing textual information versus photographical information

Worker	1	2	3	4	5	6	7	8	9	10
1	1:23	0:49	5:23	2:53	7:05	3:50	7:56	3:42	3:56	1:56
2	1:56	0:56	5:36	3:03	7:23	4:03	7:41	3:29	4:01	1:59
3	2:45	0:58	4:47	3:29	7:52	4:29	8:29	4:01	4:23	3:00
4	0:52	0:59	3:44	2:01	6:12	2:25	8:21	3:21	3:52	2:02
5	0:59	0:48	3:51	2:22	6:11	2:56	8:45	3:10	3:59	2:36
6	1:52	0:47	4:56	2:25	6:51	2:59	7:23	4:51	4:04	2:54
7	3:29	1:25	6:42	3:45	8:23	3:52	9:12	4:42	5:21	3:58
8	3:12	1:45	6:23	3:58	8:56	3:59	9:02	5:39	5:32	3:44
9	1:41	0:45	5:25	2:54	6:25	3:45	7:11	4:01	4:05	2:25
10	1:25	0:39	5:52	2:48	6:10	3:29	7:02	3:53	3:45	2:48
Average	1:57	0:59	5:15	2:57	7:08	3:34	8:06	4:04	4:17	2:44

4. Conclusions

Instructions are very detailed documents that offer precise informations regarding relational activities except procedural activities and the way in which the procedural processes can be respected. These contain information about the responsabilities that each staff member has, has they have to be fulifilled, what instruments and documents are used.

The processes with a high risc or with a trasnfer of knowledge highlight one of the reasosns why instructions are used.

Frequently check lists, plans, diagrams and instructions are used in the process of production.

Regardless of the format in which they are made, the instructions are necessary for creating the information transfer to the employees, with the faithfull implementation of necessary quality requerements to be done, for obtaining a finished product according to the client's needs.

The decission of S.C. Allcolors Serv Srl to use instructions based on photographic exposition of what is according to the quality expectations versus what is not has brought immediate results, and on a long term it has determined a significant efficiency, proved by real results that were gained, the time saved and the reduction of production costs.

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